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IN THE APPLICATION

OF

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FOR A

BURP GAS FILTERING AND DEODORIZING DEVICE

BURP GAS FILTERING AND DEODORIZING DEVICE

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Patent Application Serial No. 60/437,752, filed January 3, 2003.

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

The present invention relates generally to air and gas filtration devices, and more particularly to personal filtration devices for eliminating eructation, or burp, odor.

2. DESCRIPTION OF RELATED ART

Burp or eructation odors have been a source of annoyance or concern in polite society for hundreds of years. Far too often, the foods that we love most cause us to belch. To the person who is belching, the odor may be a trifling annoyance, especially if the burp was the result of an enjoyable meal. However, for persons in the close vicinity of the burp, the burp is simply an

unpleasant odor of someone else's partially digested food. Many people wish to eliminate the burp odor so as to avoid offending others.

5 Numerous methods have been devised to address the burp odor problem. Foremost among the proposed solutions are counteracting scents. These counteracting scents, such as peppermint or cinnamon candies, act to mask the burp odor with a stronger, more dominant or pleasant scent. However, the burp odor remains beneath, barely hidden, unaltered and simply masked. Another
10 attempt to eliminate burp odor involved the use of chemicals.

Chemicals were used to alter or bind the most offensive chemicals, particularly those compounds containing sulfur, and render them harmless. These efforts were an attempt to create a burp without odor, or to eliminate the burp altogether. These
15 efforts failed because of the tremendous number of different chemicals that are capable of creating offensive odors, and because of the numerous sources of gas that are present in the foods we eat. In addition, one must take care in using the various chemical methods of burp control.

20 The various chemical methods for controlling the odor of burps may not be harmless. The seemingly innocuous peppermints are now known to affect the operation of sphincters within the digestive tract. The more complex odor, gas, and acid controlling

chemicals may have long-term effects that are still unknown. Thus, the next logical step is to eliminate the odor of a burp outside of the body. That is, as the burp is expelled. Thus, what is needed is a personal burp-filtering device that neutralizes burp odors quickly and is discreetly portable for use in any social setting.

U.S. Patent No. 3,533,414, issued to Jon W. Beam on October 13, 1970, teaches a mechanical tobacco smoke filter for use in conjunction with a tobacco rod suitable for smoking.

U.S. Patent No. 3,830,244, issued to John A. Luke on August 20, 1974, discloses tobacco-smoke filters for use in conjunction with tobacco products.

U.S. Patent No. 4,350,037, issued to Peter Higham on September 21, 1982, teaches a personal gas monitor. However, the device does not require intake or exhaust ports, but instead measures gas passively. Further, the device does not filter the air, but collects samples of impurities for monitoring.

U.S. Patent No. 5,224,975, issued to Purnell et al. on July 6, 1993, discloses a litter box deodorizer. However, the device does not require a user to provide airflow through the device. It is a passive, porous container for holding deodorizing materials.

U.S. Patent No. 6,345,625 B1, issued to Kar Eng Chew on February 12, 2002, teaches a filter for secondary smoke and

smoking articles incorporating the same, the device being a single-purpose and incapable of performing other functions.

U.S. Patent No. 6,395,046 B1, issued May 28, 2002, to Emig et al. describes a filter having nano non-woven tissue.

5 U.S. Patent No. 6,231,643 B1, issued May 15, 2001, to Pasic et al. describes the use of woven nano filter material for removal of molecules such as NO_x and SO_x from a gas.

10 U.S. Patent Publication No. 2003/0082794 A1, published May 1, 2003, for Haridas et al., describes a biological filter for the purification of waste gases.

15 The brochure "Purafil Chemisorbant Media for removal of toxic, odorous, and corrosive gases" available from Purafil, Doraville, GA as taken from their Internet Website describes granular chemisorbants useful for removal of contaminant gases by adsorption, absorption, and chemical reaction.

None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed.

20 SUMMARY OF THE INVENTION

The burp filtering device has the body of a writing pen, with an intake port at the upper end of the body, a plurality of

exhaust ports adjacent the writing tip, and a filter disposed within the body. The filter may be made of activated charcoal or other media for filtering and adsorbing or absorbing eructation odors. In use, the user holds the upper end of the pen body to his lips, releases the suppressed burp, and the filtered, deodorized gas, is exhausted through the ports at the writing tip.

Accordingly, it is a principal object of the invention to provide a device that neutralizes burp odors.

It is another object of the invention to provide a device as above for eliminating burp odors that does not require the user to ingest chemicals.

It is a further object of the invention as above to provide a device for eliminating burp odors that is portable and discreet.

Still another object of the invention is to provide a device for eliminating burp odors that also serves as a writing instrument.

Yet another object of the invention is to provide a device as above having a replaceable filter.

It is an object of the invention to provide improved elements and arrangements thereof in an apparatus for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an environmental, perspective view of a burp filtering device according to the present invention.

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Fig. 2 is a side perspective, view of a burp filtering device as in Fig. 1 with the cap removed and the housing wall partially broken away.

Fig. 3 is a side perspective view of a burp filtering device of Fig. 1 with the cap covering the exhaust end.

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Fig. 4 is a side perspective view of a burp filtering device as in Fig. 1 with the cap stowed on the intake end.

Fig. 5 is a fragmented, longitudinal, section view of a burp filtering device according to the present invention.

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Fig. 6 is a transverse section view taken along lines 6-6 of the embodiment of Fig. 5, showing hidden features of a burp filtering device according to the present invention.

Fig. 7 is a transverse section view taken along lines 7-7 of the embodiment of Fig. 5, showing the tip end support vanes of a burp filtering device according to the present invention.

Fig. 8 is a fragmented, elongated sectional view similar to that of Fig. 5, having inner and outer perforated filter walls for supporting a granular filter medium.

Fig. 9 is a fragmented, elongated sectional view similar to that of Fig. 8 having a layered membrane filter.

Fig. 10 is a fragmented, elongated sectional view similar to that of Fig. 9 having an amorphous nanofilter or the like.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is a burp-filtering device, more specifically a burp-filtering and deodorizing pen. The burp-filtering pen includes a generally tubular pen housing, an intake port, a plurality of exhaust ports, a pen tip, ink cartridge, and filtration media.

Referring to Fig. 1 there is shown a burp filtering pen in use. In the preferred embodiment, the pen 10 has a generally tubular housing or body wall 11 having an upper end 13 having an intake port 14 extending axially therethrough, affixed to the pen housing 11. A plurality of exhaust ports 16 are defined at a lower end of the pen housing 11. Pen 10 has a pen cap 12 attached

in place over the writing tip 20 and the plurality of exhaust ports 16 spaced above writing tip 20. Pen 10, as shown, with pen cap 12 in place is in the normally closed position. The user holds the burp-filtering pen to his or her mouth as a burp is occurring. The user exhales the burp gas through the mouth, and not the nose, and directs the burp gas through the intake port 14 of the burp-filtering pen. The burp gas is filtered and deodorized inside the pen housing 11 and flows out the plurality of exhaust ports 16. In one embodiment, the burp-filtering pen includes a pen cap 12. The pen cap 12 has a cap port 18 to allow filtered gas from the plurality of exhaust ports 16 to escape. The pen cap 12 may have a pocket clip 22 affixed to it to permit the user to securely store the burp-filtering pen in a pocket.

Referring to figures 2, 3, and 4, there is shown a burp-filtering and deodorizing pen 10 with a pen cap 12. The pen housing 11 is generally tubular to permit gas flow into its axial center cavity. There is an intake port 14 in the upper end cap 13 of the pen housing 11, and a plurality of exhaust ports 16 at the lower end of the pen housing 11. The user blows air or burp gas through the intake port 14, and the air or gas is filtered inside the pen housing 11. Filtered and deodorized air or gas flows out of the pen 10 through the plurality of exhaust ports 16. A writing tip 20 is fixed adjacent to and spaced below the plurality

of exhaust ports 16. The writing tip 20 may be a ballpoint, felt tip, or other similar type of stylus. Ink is supplied to the writing tip 20 by an ink cartridge 28 that is attached to the writing tip and located inside the pen housing 11. As seen in Fig. 2, the interior space within the pen housing 11 and surrounding the ink cartridge 28 may be filled with gas filtering and deodorizing material 15 such as fibrous material.

Fig. 2 shows the pen cap 12 removed from pen housing 11, while Fig. 3 shows the pen cap 12 covering the lower end of the pen housing. The cap port 18 acts as one of the plurality of exhaust ports 16. The pen cap 12 does not interfere with airflow through the pen 10. Fig. 4 shows the pen cap 12 stored on the upper end of the pen housing 10. In this position, the cap port 18 acts as a supplemental intake port. The user blows the burp gas through the cap port 18 and from there the burp gas flows into the intake port 14 to be filtered and deodorized. In this manner, the placement of the pen cap 12 is not critical to the operation of the burp-filtering pen. In one embodiment, the pen cap 12 has a pocket clip 22 which may be used to clip the burp-filtering pen to the user's pocket or to prevent the burp-filtering pen from rolling down a slightly sloped table top.

Fig. 5 shows a more detailed embodiment of pen 10 providing for a replaceable filter element. The pen housing 11 is generally

tubular in configuration and the hollow space therein houses a plurality of vanes **24** extending radially inward from the housing **11** (shown in Fig. 6), a tubular filtration element **26**, an axially disposed ink cartridge **28**, an unfiltered air cavity **30** formed between filtration element **26** and ink cartridge **28**, a filtered air cavity **32** formed in the annulus between filtration element **26** and housing **11**, a washer-shaped intake sealing gasket **34**, and a washer-shaped exhaust sealing gasket **36**. The upper end cap **13** and the upper end portion of the pen housing **11** have interfitting screw threads **33**, enabling the removal of the end cap **13**, the replacement of filtration element **26**, and the reattachment of upper end cap **13** to pen housing **11** by screwing action.

The user blows burp gas through an intake port **14** in upper end cap **13** at the upper end of the pen **10**. The burp gas flows through the intake port **14** and the intake sealing gasket **34** and into the unfiltered air cavity **30**. The intake sealing gasket **34** is fit between the upper end of the filtration element **26** and the upper end cap **13** to prevent unfiltered gas from entering the filtered air cavity **32** formed in the annular space between vanes **34** before going through the filtration element **26**. In the preferred embodiment, the filtration element **26** is a tubular structure made of a filtering and deodorizing composition, such as activated charcoal. In the embodiment of Fig. 5, the filtration

media is of micro-porous, self supporting material such as bound activated charcoal, porous ceramic, or sintered porous metal or other appropriate material effective to filter and deodorize the burp gas. The thickness of the filter wall may be varied depending on the type of filter material used.

Burp gas flows into the unfiltered air cavity 30 in the center of the tubular filtration media 26, but is blocked at the lower end of the pen housing 11 by the exhaust sealing gasket 36. In the embodiment of Fig. 5, the lower side of exhaust sealing gasket 36 is supported by vane gasket supports extending radially inward from vanes 24. Due to the modest pressure exerted by the user, the burp gas enters the filtration 26 and is filtered and deodorized. Upon exiting the filtration element 26, the odor-free burp gas is now in the annular filtered air cavity 32. The burp gas flows between the filtration element 26 and the pen housing 11 and vanes 24 to the plurality of exhaust ports 16, where it enters the atmosphere.

A writing tip 20 is fixed adjacent to the lower end of pen housing 11, spaced below the plurality of exhaust ports 16. The writing tip 20 is attached to an ink cartridge 28. The ink cartridge 28 supplies ink to the writing tip 20. The ink cartridge 28 is located in the unfiltered air cavity inside the hollow center of the tubular filtration element 26 its wall being

sealed against closely fitting gasket **36** to avoid gas bypassing the filter element **26**. The upper end cap **13** is inserted such that mechanical pressure is exerted through upper gasket **34** to filtration element **26** and thereby to lower gasket **36** and vane gasket supports **38** such as to slightly expand gasket **36** radially inward, thus assuring an effective seal and a secure seating of filtration element **26**.

Fig. 6 is a section view of the embodiment of Fig. 5, showing the concentric arrangement of the features of the burp-filtering pen in the preferred embodiment. The pen housing **11** is generally tubular and has a plurality of radially extending vanes **24** which extend longitudinally along the inside wall of the housing. The plurality of vanes **24** serve to center the filtration element **26** and to provide a filtered air cavity **32**. The filtration element **26** is a generally tubular element that separates the filtered air cavity **32** from the unfiltered air cavity **30**. An ink cartridge **28** is axially centered within the filtration element **26** and the unfiltered air cavity **30**. Thus, the gas-flow through the burp-filtering pen is properly controlled for maximum efficiency.

Fig. 7 shows the vane gasket supports **38** extending inward from the respective lower ends of vanes **24** for supporting lower outlet gasket **36** while allowing filtered and deodorized gas to escape to the tip **20** and through exhaust ports **16** (see Fig. 5).

Referring to Fig. 8, there is shown another embodiment of the invention wherein a filter element 39 has an inner wall 40 having perforations 42, a filter outer wall 44 having perforations 46, an upper end wall 48 and a lower end wall 49 and containing a disperse filter media such as granules 54 forming a filter element 39 similar to that of tubular filter element 26. The granules 54 may be of an adsorbing and absorbing material such as activated charcoal, or an adsorbing, absorbing, and chemical reaction material such as that described in a brochure entitled "Purifil Chemisorbant Media for removal of toxic, odorous, and Corrosive gasses," as published on the Purafil, Inc. Internet website, the granular material being obtainable from Purafil, Inc., Doraville, Georgia. The granules 54 are preferably of at least such sized relative to perforations 42 and 46 as to not exit filter element 39.

Also shown in Fig. 8 is an alternative arrangement for supporting lower gasket 36 wherein spring 50 extends along the lower portion of ink cartridge 28 and extends between the upper wall of tip 20 and a metal washer 52, which, in turn, bears against the lower side of lower gasket 36. Upon the screwing in of upper end cap 13, spring 50 is compressed, providing a snug support system for filter element 39. This arrangement may be employed as an alternative to vane gasket supports 38 in the

embodiment of Fig. 5, as described above. The vane gasket supports **38** of the embodiment of Fig. 5 may also be substituted for the spring and washer of Fig. 8, and of Figs 9 and 10 as discussed below.

5 Referring to Fig. 9, there is shown an embodiment of the invention similar to that of Fig. 8, having layered membrane filter media **56** such as layers of woven nano woven material. Such a material is described by Pasic et al. in U.S. Patent No. 6,231,643, the disclosure of which is hereby incorporated by
10 reference.

Referring to Fig. 10, there is shown an embodiment of the invention similar to that of Fig. 9, having a non-woven fibrous filter layer **58**, such as that shown in Fig. 2, which may include nano non-woven material as described by Emig et al. in U.S. Patent
15 No 6,395,046 B1, the disclosure of which is hereby incorporated by reference.

The pen **10** may be constructed of conventional materials such as metal or plastic as desired.

20 It is to be understood that the present invention is not limited to the sole embodiments described above, but encompasses any and all embodiments within the scope of the following claims.